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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/083,450	02/25/2002	Viraraghavan S. Kumar	204.021700	8317

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EXAMINER

RIVELL, JOHN A

ART UNIT

PAPER NUMBER

3753

DATE MAILED: 11/16/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/083,450

Applicant(s)

KUMAR, VIRARAGHAVAN S.

Examiner

John Rivell

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 8/2/04 (sub. spec. amendment, draws).
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 21-65 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 21-65 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 02 August 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

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Claims 1-20 have been canceled. New claims 21-65 have been added and are pending.

The substitute specification filed August 2, 2004 has been entered.

The drawing corrections filed August 2, 2004 are acceptable.

In order to avoid abandonment, the drawing informalities noted in the paper mailed on February 9, 2004 (paper no. 5, PTO-948 drafting review), must now be corrected. Correction can only be effected in the manner set forth in the above noted paper.

Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 21-65 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 21, 37 and 51 (all the independent claims) recite the limitation "said upper armature cavity" in lines 25, 25 and 28, respectively. There is insufficient antecedent basis for this limitation in the claim.

The remaining claims are included due to dependency.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 21-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Osumi et al. (U. S. Pat. No. 4,953,825) in view of Kumar (4,954,799).

The patent to Osumi et al. discloses "a valve assembly comprising: a solenoid coil (4) adapted to generate a magnetic flux, and having a longitudinal axis and a bore coaxial therewith; an axially translatable armature (3) made of a magnetic material, said armature supported within an armature cavity for axial translation along said longitudinal axis; a magnetic pole piece (5) disposed within said bore of said solenoid coil, said magnetic pole piece having a lower distal end and being magnetically coupled to said armature and forming an axial air gap... between said armature and said lower distal end of said magnetic pole piece (5); a valve unit (valve 1, plate 1b), mechanically coupled to said armature (3), said valve unit having an interior valve poppet cavity in fluid communication with a fluid inlet port (8) to which fluid is applied at a first fluid pressure and a fluid exit port (9) from which said fluid is output at a second fluid pressure and containing a valve seat (22) therebetween, said valve seat (22) adapted to be closed by a valve closing assembly comprised of a valve poppet (plate 1b) mechanically coupled to said armature (3), so as to regulate fluid flow between said fluid inlet port and said fluid exit port;... and a fluid pressure balancing arrangement (diaphragm 24 and central port 11) adapted to compensate for said first fluid pressure and said second fluid pressure being exceeded against said valve poppet (1b), said fluid pressure balancing arrangement comprising a diaphragm (24) between said upper armature cavity and said interior valve poppet cavity and a fluid communication path (11) through said valve closing assembly, said fluid communication path providing fluid communication between said fluid exit port (9) and said upper armature cavity" as recited in claim 21.

Thus the patent to Osumi et al. discloses all the claimed features with the exception of having a "radial air gap" and "an armature centering mechanism".

The patent to Kumar ('799) discloses that it is known in the art to employ an "axial air gap" as well as a "radial air gap" 97 in the solenoid valve actuator and a "centering mechanism" at centering springs 80B, 80T (see also column 2, lines 5-35 for example) for the purpose of providing a substantially constant linear force from the solenoid coil and to center and hold the reciprocal valve elements in the center, respectively.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to employ in Osumi et al., in addition to the axial air gap therein, a radial air gap and a centering mechanism for the purpose of providing a substantially constant linear force from the solenoid coil and to center and hold the reciprocal valve elements in the center, respectively, as recognized by Kumar ('799).

Regarding claim 22, in Osumi et al., "said valve poppet (1b) further comprises a sealing ring (23) disposed on a poppet face of said valve poppet (1b) to form a fluid-tight seal between said valve poppet (1b) and said valve seat (22) in a manner that prevents fluid communication between said fluid inlet port (8) and said fluid exit port (9)" as recited.

Regarding claim 23, in Kumar ('799) said armature (at armature cap 180) is further comprised of a ferrule-shaped projection, said ferrule shaped projection of said armature forming said radial air gap between said magnetic pole piece and said armature" as recited.

Regarding claim 24, in Kumar ('799) "said lower distal end of said magnetic pole piece (at the lower end of element 110) is further comprised of a ferrule-shaped

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projection, said ferrule-shaped projection forming said radial air gap between said magnetic pole piece and said armature" as recited.

Claims 37-40 and 48-50 are rejected under 35 U.S.C. 103(a) as being unpatentable over Osumi et al. in view of Kumar (4,954,799) as applied to claims 21-24 above, further in view of Everett (U.S. Pat. No. 4,463,332).

The patent to Osumi et al., as modified by Kumar ('799), discloses all the claimed features with the exception of having the magnetic pole piece supported within the solenoid bore "exclusive of the use of non magnetic material".

The patent to Everett discloses that it is known in the art to employ a magnetic pole piece at 18, mounted within a bore of a solenoid coil 28 "exclusive of the use of non magnetic material" for the purpose of easier manufacturing as the parts need no further manipulation concerning plastics, coatings, or other manufacturing steps which would be required had plastics materials been needed for construction.

It would have been obvious at the time the invention was made to a person having ordinary skill in the art to employ in Osumi et al., as modified by Kumar ('799), a magnetic pole piece supported within the bore of the solenoid coil "exclusive of the use of non magnetic materials for the purpose of easier manufacturing as the parts need no further manipulation concerning plastics, coatings, or other manufacturing steps which would be required had plastics materials been needed for construction as recognized by Everett.

Regarding claim 38, in Osumi et al., "said valve poppet (1b) further comprises a sealing ring (23) disposed on a poppet face of said valve poppet (1b) to form a fluid-tight seal between said valve poppet (1b) and said valve seat (22) in a manner that prevents fluid communication between said fluid inlet port (8) and said fluid exit port (9)" as recited.

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Regarding claim 39, in Kumar ('799) "said armature (at armature cap 180) is further comprised of a ferrule-shaped projection, said ferrule shaped projection of said armature forming said radial air gap between said magnetic pole piece (110) and said armature" as recited

Regarding claim 40, in Kumar ('799) "said lower distal end of said magnetic pole piece (at lower end of element 110) is further comprised of a ferrule-shaped projection, said ferrule-shaped projection forming said radial air gap between said magnetic pole piece and said armature" as recited.

Regarding claim 48, in Osumi et al., "said diaphragm (24) has an annular area substantially the same as an annular area of said valve seat" as recited.

Regarding claim 49, in Kumar ('799) "said armature centering mechanism is a pair of spiral-configured suspension springs" 80B and 80T as recited.

Regarding claim 50, in Kumar ('799) "said valve assembly further comprises an O-ring (at O-ring 37) to prevent fluid leakage between said valve unit and said armature cavity" as recited.

Claims 25-36 and 41-47 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 51-65 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, 2nd paragraph, set forth in this Office action.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).


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A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Rivell whose telephone number is (703) 308-2599. The examiner can normally be reached on Mon.-Thur. from 6:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gene Mancene can be reached on (703) 308-2696. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
**John Rivell**  
**Primary Examiner**  
**Art Unit 3753**

j.r.